



Supply-side



Today

- Meso-theories of firms in innovation systems (Allard van Mossel)
- Innovation strategies of the firm (Maryse Chappin)
- Serious Game (Allard van Mossel)



Meso-theories of firms in innovation systems



Question: what do firms do?

- Organization science
- Shared lineage, divergent theorizing
- Contemporary offspring includes:
 - Behavioral theory of the firm
 - Institutional theory
 - Organizational ecology
- And more in my paper: *"How Theories of Organization Inform Transition Studies"* (early conference paper available online)





Rational model (i)

- Identify problem → Generate alternatives
→ Select the best solution
- Assumes:
 - full information
 - no computational limits
 - consensus



Rational model (ii)

- Identify problem → Generate alternatives
→ Select the best solution

Criticism:

- Assumes:
 - full information
 - no computational limits
 - consensus





A new set of assumptions

- Satisficing: limited searching for information. Fail to identify problems and solutions (Simon, 1997)
- Bounded rationality: limited capacity to process information
- Organizational coalitions: quasi-resolution of conflict (Stevenson et al., 1985)



Behavioral Theory of the Firm

- Internal focus
- Firm behavior results from interplay between:
 - Routines
 - Aspirations
 - Experience
- Evolutionary Economics (Nelson and Winter, 1977; 1982)
- Organizational Learning (Fiol and Lyles, 1985)



Closed
system



Open
system

Organizational environment



" The set of forces surrounding an organization that have the potential to affect the way it operates and its access to scarce resources" (Jones, 2004: 81)



Behavioral change

- Only when performance < aspirations
- Firms can adapt their routines and capabilities when environmental change makes them inappropriate
- Internal processes limit ability to do so



Organizational environment



Institutional environment:
“set of values
and norms that
govern the
behavior of a
populations of
organizations”
(Jones, 2004: 337)



Institutions

“are more-or-less taken-for-granted repetitive social behavior that is underpinned by normative systems and cognitive understandings that give meaning to social exchange and thus enable self-reproducing social order” (Greenwood, 2008:5)

- Regulative
- Normative
- Cultural-cognitive (Scott, 2008:48)





Neo-institutional theory (i)

Why do organizations become so similar?

- Meyer and Rowan (1977) focused on the spread and elaboration of formal structure
- Myths of the environment vs. technically efficient practices



Basic concepts (i)

Institutionalization: involves the processes by which social processes, obligations, or actualities come to take on a rule-like status in social thought and action



Basic concepts (ii)

Organizational field: those organizations that, in the aggregate, constitute a recognized area of institutional life (DiMaggio and Powell, 1983 :148)



Basic concepts (iii)

Legitimacy: “generalized perception or assumption that actions [...] are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman, 1995, p. 574)



Neo-institutional theory (ii)

Isomorphism: “a constraining process that forces one unit in the population to resemble others units that face the same set of environmental conditions” (DiMaggio and Powell, 1983: 149)



Neo-institutional theory (iii)

Three processes that explain why organizations become similar are:

- Coercive isomorphism
- Mimetic isomorphism
- Normative isomorphism



What about innovation? (i)

- Isomorphism
 - inertia
 - low incentives to innovate
- Prevailing institutions are likely to resist change in existing practices
- Stability



What about innovation? (ii)

Existing institutions within an Innovation System can hinder development of new technologies



What about innovation? (iii)

- Institutions might change over time
- But organizations can also be involved



Origins of non-conformance

- Multiplicity (embedded in >1 environment) (Scott, 2001; Kraatz & Block 2008)
- Institutional complexity (Greenwood et al., 2011)

→ Strategic behavior



Timing of adoption

Different motives early versus later adopters:

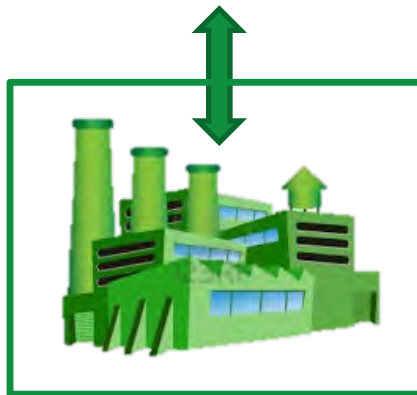
- Early adopters more triggered by technical gains; late adopters more motivated by social gains (legitimacy)

(c.f. Tolbert & Zucker 1983; Westphal et al., 1997).

- Motives can coexist (Kennedy and Fiss, 2009).
- Bandwagons (Abrahamson and Rosenkopf, 1993)

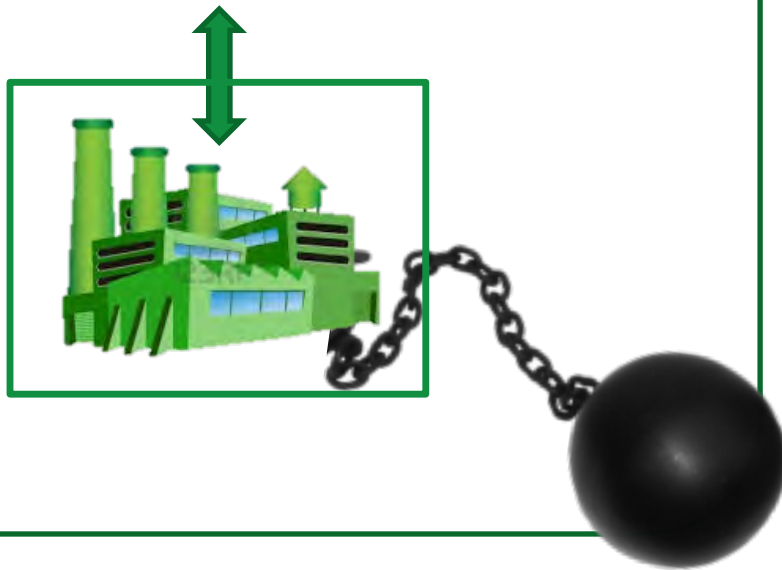


Organizational environment





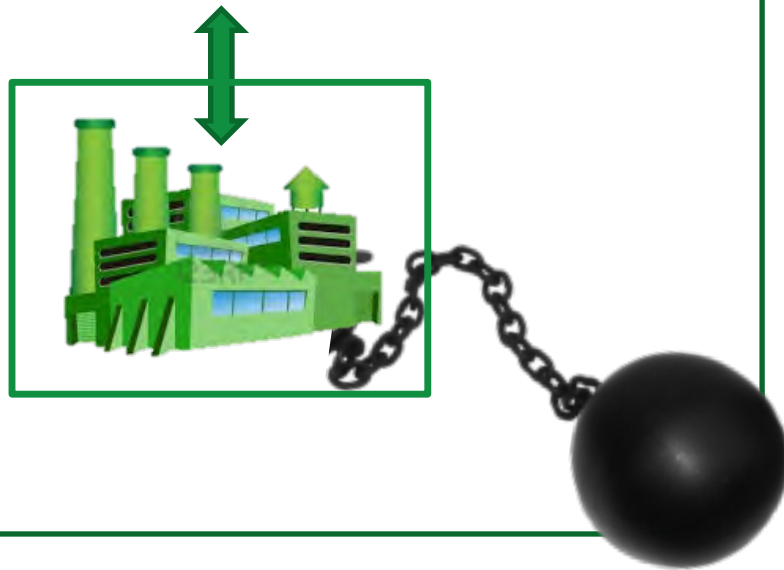
Organizational environment





match between environmental change and a firm's response to it is essentially random (Hannan and Freeman, 1977)

Organizational environment





Organizational Ecology (i)

Assumptions:

- Organizations are “unable” to adapt
- Selection is major driver of change

Why are there so many kinds of organizations? (Hannan and Freeman, 1977:936)



Organizational Ecology (ii)

Aim:

- Focuses on the processes and rates of organizations founding, failure and change at population level
- To strive for explanations for organizational diversity at population level

Population: a set of organizations engaged in similar activities and with similar patterns of resource utilization



Founding and failure

- Density dependence
- Liability of newness
- Liability of smallness



Organizational niches

- Specialists: organizations that concentrate their skills to pursue a narrow range of resources in a single niche
- Generalists: organizations that spread their skills thin to compete for a broad range of resources in many niches



In sum

Theory	Goal of the firm	Firm–environment balance
Behavioral Theory of the Firm	Achieve aspiration levels	Firm—the interaction between routines, experience, and aspirations governs firm behavior.
Institutional Theory	Acquire legitimacy	Environment—institutional demands govern firm behavior.
Organizational Ecology	Survive	Mixed—behavior is influenced by the environment, but not determined by it. Variation in behavior may occur.

And more in my paper: *“How Theories of Organization Inform Transition Studies”* (early conference paper available online)

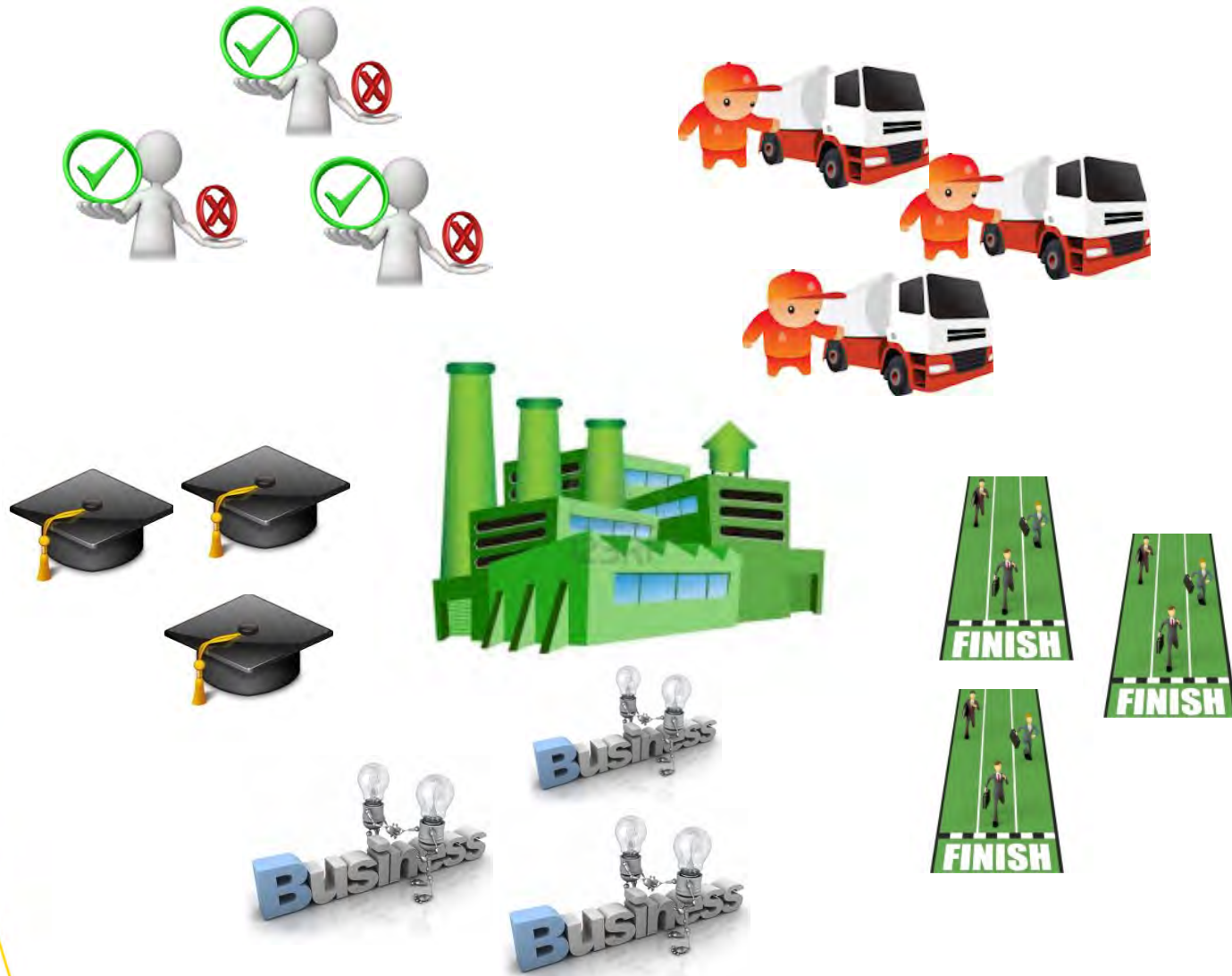


Innovation strategies of the firm



Outline innovation strategies

- Open innovation
 - What
 - Why
 - How
- Strategies relevant for game





Open innovation

“the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation respectively”

(Chesbrough et al 2006, p.1).

Joy's law: No matter who you are, most of the smartest people work for someone else



Different concepts

Open innovation

Open source innovation

User innovation

Crowdsourcing



Open?

- Outcome
- Process

Innovation Process:	Innovation Outcome:	
	Closed	Open
Closed	1. Closed Innovation	3. Public Innovation
Open	2. Private Open Innovation	4. Open Source Innovation

(Huizingh, 2011: 3)



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Why?



Review open innovation

West, Joel and Bogers, Marcel, "Leveraging External Sources of Innovation: A Review of Research on Open Innovation," *Journal of Product Innovation Management* 2014; 31(4):814-831

→ Focus on outside-in and coupled



Approach

25 top journals

- SSCI: open innovation
- SSCI: cite Chesbrough 2003
- Google scholar: open innovation (title) and 100+ citations

→ 291 publications

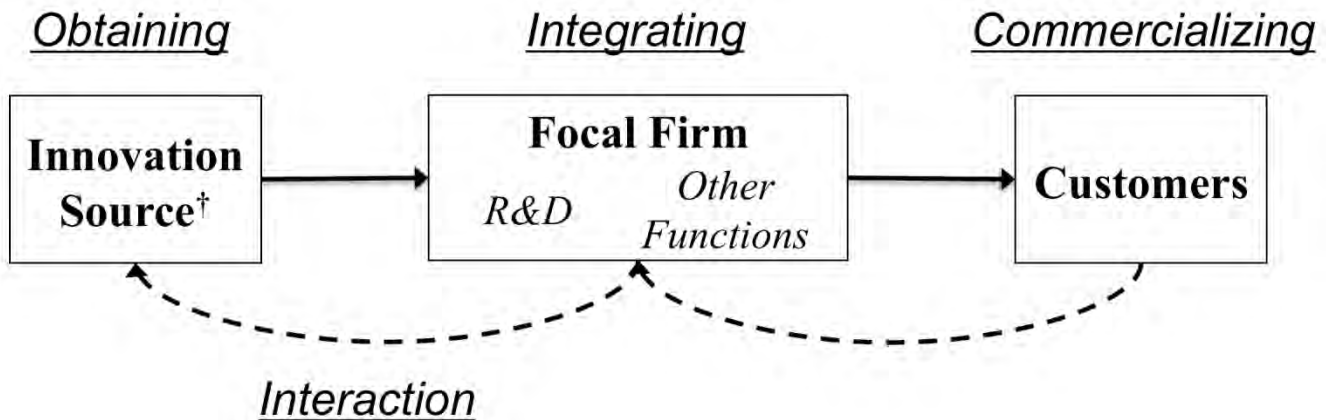
→ 165 publications

→ 151 publications



Their model (West and Bogers, 2014)

A four-phase process model for profiting from external sources of innovation



† Sources may include suppliers, rivals, complementors and customers.



Obtaining innovations

- Best covered phase
- Searching, Enabling/Filtering, Acquiring
- Focus on sources of innovation



Integrating innovations

- In order to profit, innovations need to be integrated into firm's R&D activity
- Role of absorptive capacity in relation to collaboration and performance
- Role of organizational culture
- New competences?



Commercializing innovations

- Value creation and value capture



Interaction mechanism

- Beyond linear model
- Feedback mechanisms
- Reciprocal innovation process



TABLE 4

Key categories for research on profiting from external sources of innovation

Phase	Category	Open Innovation Topic	Representative Articles
1. Obtaining	Searching	<ul style="list-style-type: none"> • Sourcing • Technology scouts • Limits 	Dodgson et al. (2006); Laursen and Salter (2006)
	Enabling/ Filtering	<ul style="list-style-type: none"> • Brokerage • Contests • Intermediaries • Toolkits • Platforms • Gatekeepers 	Jeppesen and Lakhani (2010); Piller and Walcher (2006); Whelan et al. (2010)
	Acquiring	<ul style="list-style-type: none"> • Incentives to share • Contracting • Nature of the innovation 	Ceccagnoli et al. (2010); Dushnitsky and Shaver (2009)
2. Integrating		<ul style="list-style-type: none"> • Absorptive capacity • Culture and “Not Invented Here” • Incentives to cooperate • Competencies 	du Chatenier et al. (2010); Emden et al. (2006); Herzog and Leker (2010)
3. Commercializing		<ul style="list-style-type: none"> • Commercialization process • Value creation • Value capture 	Belderbos et al. (2010); Lau et al. (2010); Rothaermel and Alexandre (2009)
4. Interaction	Feedback	<ul style="list-style-type: none"> • R&D feedback • Customer/market feedback 	Berkhout et al. (2006); Hughes and Wareham (2010)
	Reciprocal	<ul style="list-style-type: none"> • Co-creation • Communities • Value networks 	Dittrich and Duysters (2007); Faems et al. (2010)

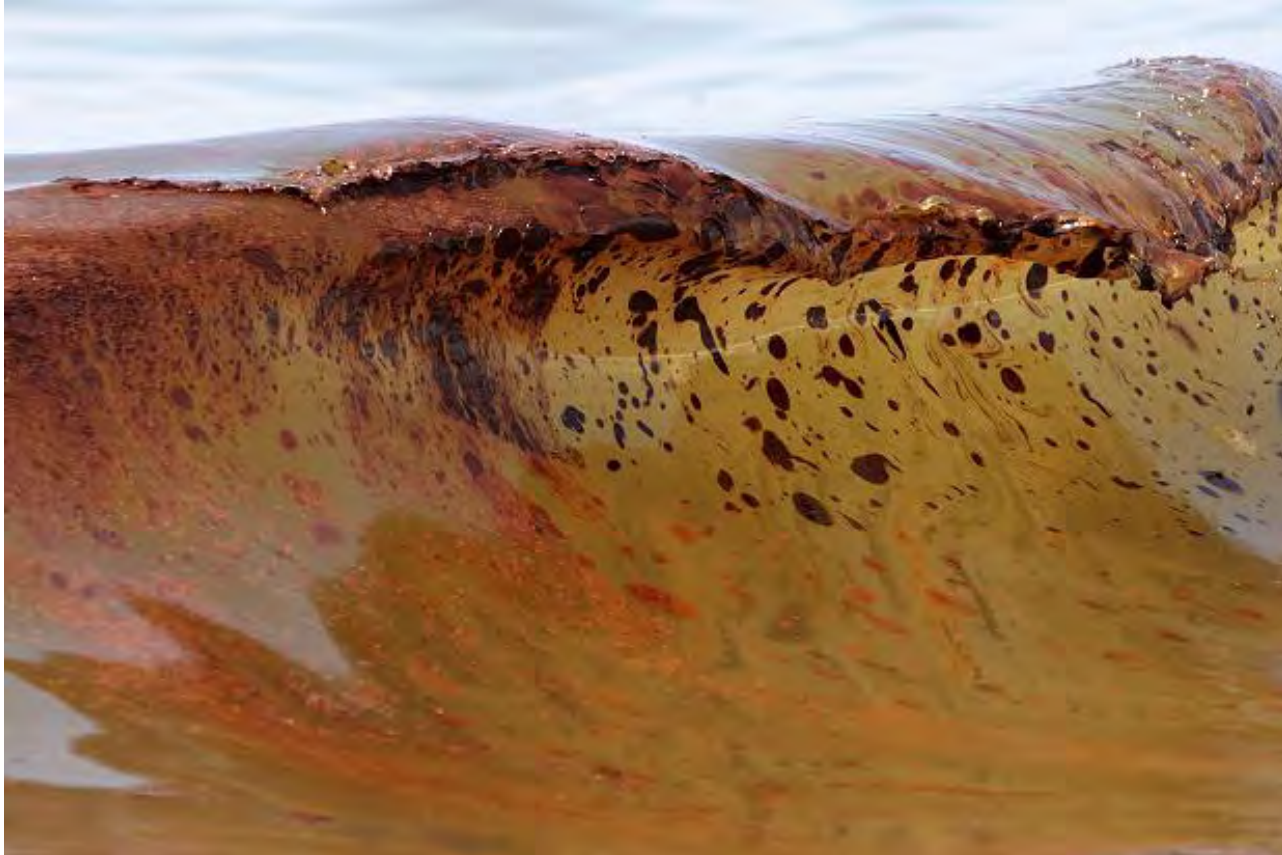


Lego





Deepwater horizon





Crowdsourcing

- 'crowdsourcing represents the act of a company or institution taking a *function* once performed by employees and *outsourcing* it to an *undefined* (and generally large) *network of people* in the form of an *open call*' (Howe, 2006, p.4 italics added).



Different crowdsourcing types

- *problem solving*
- *creative input*
- *opinion poll*
- *outsourcing tasks*
- *money raising*

Long term call vs temporary online idea contests



Example: Study with Schemmann, Herrmann & Heimeriks

RQ: Which **ideator** and **idea-related characteristics** determine whether an idea suggested in a **long-term open idea call** is **implemented**?

Explain idea implementation by:

- Ideator's motivation
- Ideator's attention towards other ideas
- Idea popularity
- Idea innovativeness



The data

Data on 92,382 ideas

1,108 ideas rejected

348 implemented

230 ideas under review

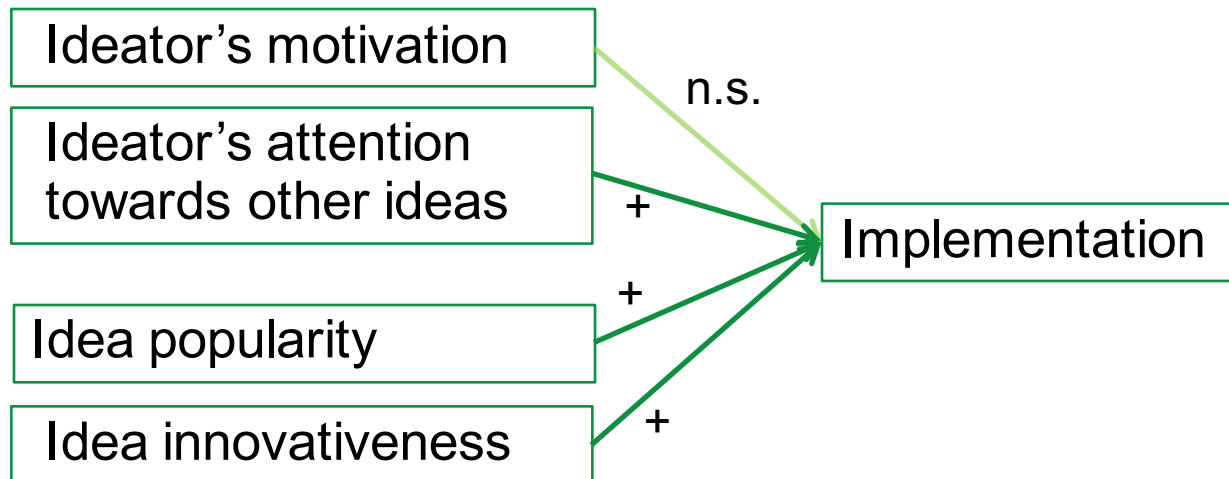
What are we talking about:

"Bite size pastries" → implemented

*"Have the previous logo on the *COMPANY NAME* drinks"* → rejected



The outcome





Example: Study with Smeets & Kaashoek

Aim: researching the effects of **process** characteristics of crowdsourcing on the output of crowdsourcing:

- Feedback to participants
- Interaction among participants

Output of crowdsourcing

- Quantity
- Variety



Results quantity

Type of crowdsourcing important factor:

- crowdsourcing complex tasks require high level of knowledge → crowd relatively small → low quantity
 - crowdsourcing creative tasks require lower level of knowledge → crowd relatively large → high quantity
-
- Duration positive effect



Results quantity

Feedback reciprocal effect

Feedback seems positive because
appreciation is a motivation

But it becomes infeasible to give feedback
for a high number of contributions and
so no feedback is given



Results variety

Negative effect of interaction (combined with creative crowdsourcing practices):

- Interaction leads to copying behavior
- Risk of groupthink

Crowdsourcing complex tasks result in variety



**Strategies relevant for
game**



Strategies relevant for game

- Innovation strategies
- Competitive strategies



Innovation strategies

Offensive

The few firms which follow an *offensive* strategy attempt to make radical innovations, sometimes but not always based on fundamental research.



Innovation strategies

Defensive

A larger number of firms follow *defensive* strategies, responding fairly quickly to the innovative efforts of others with new products and processes of their own.



Innovation strategies

Imitative

Much larger numbers of firms follow a simpler *imitative* strategy, sometimes on the basis of licensing, franchising or subcontracting from more innovative firms.



Competitive strategies

Remember specialist vs generalist?

Focus on cost or quality of product?



Competitive strategies

		Competitive Advantage	
		lower cost	uniqueness
Competitive Scope	broad	Cost leadership (Korean firms) Wide range & low price	Differentiation (Japanese firms) Wide range & premium price
	narrow	Cost Focus (Chinese firms) Simple, standard & Lowest price	Focused Differentiation (Scandinavian firms) Specialised & Premium price



Innovation strategies of the firm...in sum



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Serious game



What is it about?

- Entrepreneurs
- Solar panels (PV)
- Consumers
- Strategy
- Firm < - > environment



Teams of two

- Owners of a solar panel factory
- In the Dutch market
- With access to €500.000 startup capital



What do you do? (i)

- Expand factory / buy machines (€150.000 each)
 - Thin film, 67 kWh/m²/yr, €115
 - Polycrystalline, 77 kWh/m²/yr, €150
 - Monocrystalline, 148 kWh/m²/yr, €330
 - Multi-Junction, 223 kWh/m²/yr, €540





What do you do? (ii)

- Produce panels
- Set prices
- Invest in R&D
- Manage finances
- Respond to environment



What does the game do?

- Model consumer behavior
- Model environment
- Inform you



Consumer behavior

- Based on:
 - available budget
 - maximum acceptable payback time
 - space available (1 m²/panel)

Given that:

- consumers won't buy if expected cost/kWh > price of regular electricity
- consumers buy everything at once

→ Maximize installed capacity



Game flow



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Quarterly strategy meetings



In between quarters

Simulation

Solar
Tycoon

This quarter has ended, please wait for the results to be published.





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Quarterly strategy meetings



In between quarters

Simulation

Solar
Tycoon

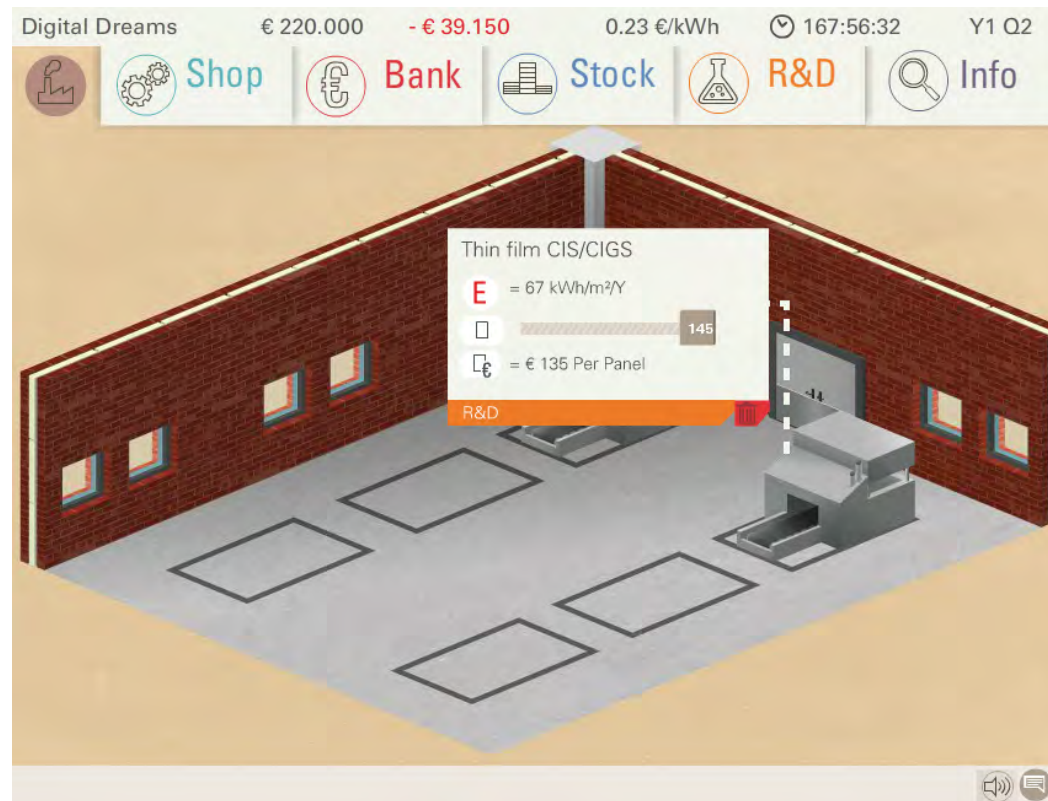
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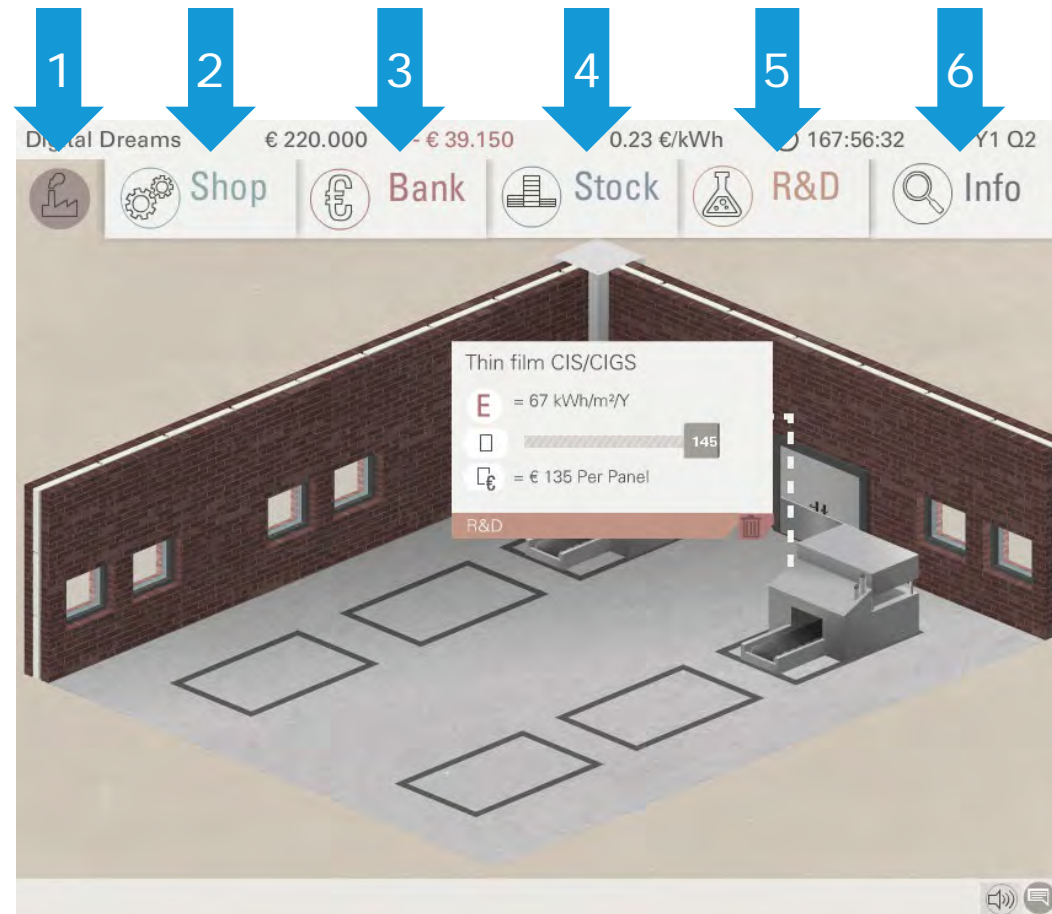
www.solartycoon.com

1. Factory floor
2. Shop
3. Bank
4. Stock
5. R&D
6. Info



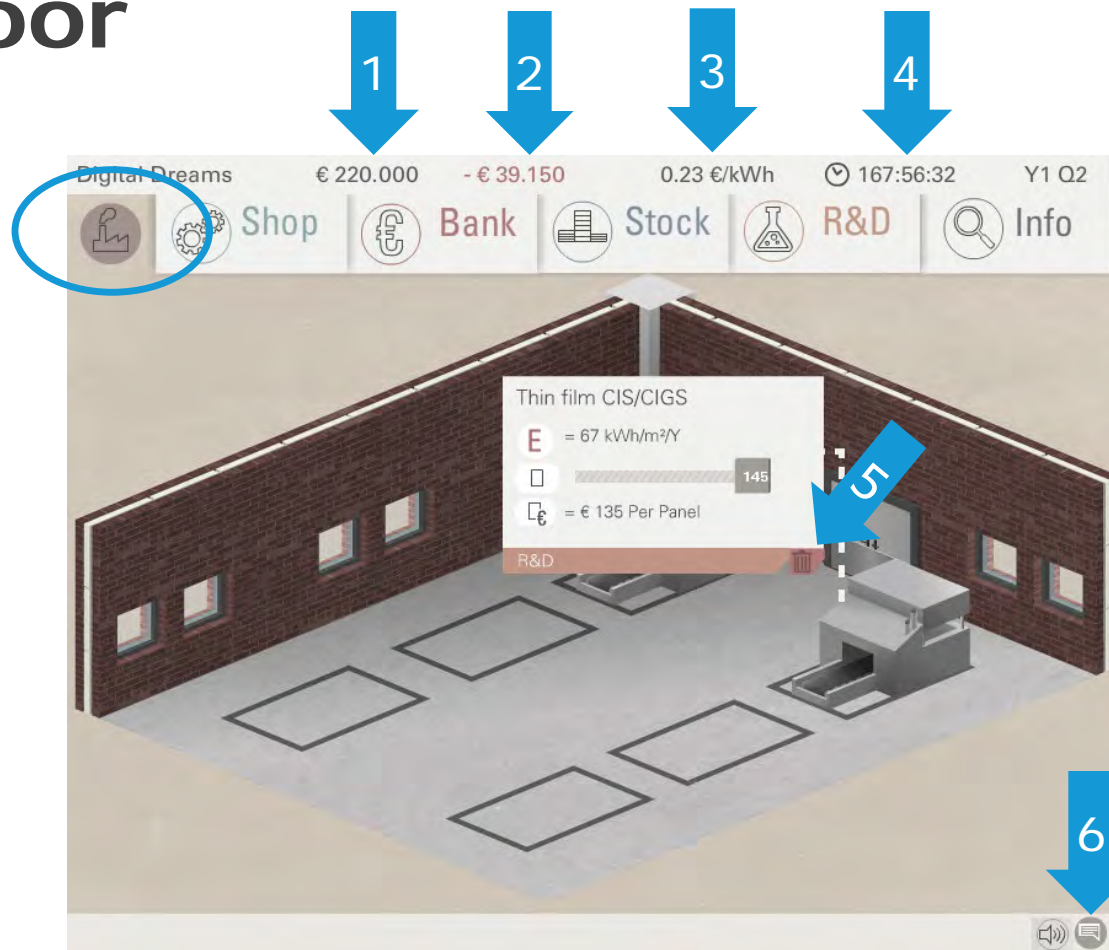
Interface

1. Factory floor
2. Shop
3. Bank
4. Stock
5. R&D
6. Info



Factory floor

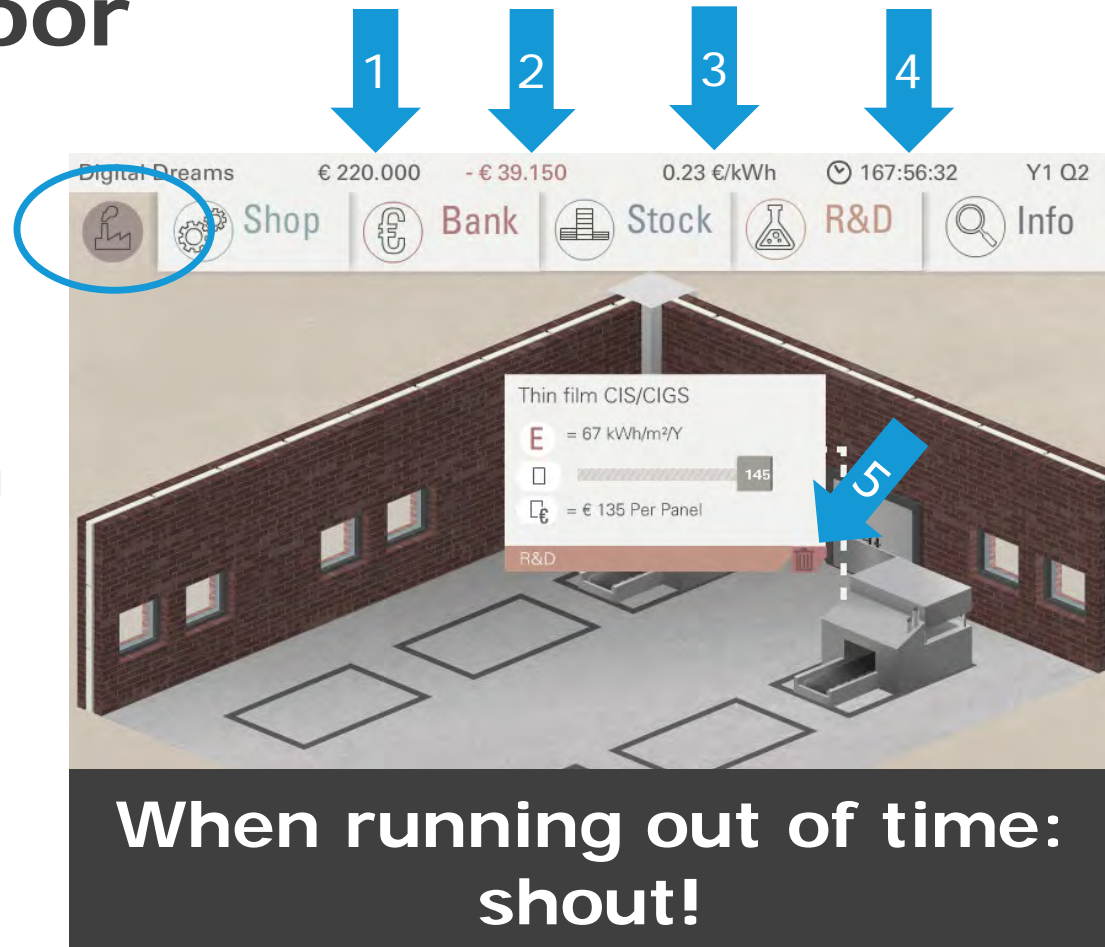
1. Your funds
2. Spendings next quarter
3. Electricity price
4. Time remaining
5. Demolish machines
6. Messaging





Factory floor

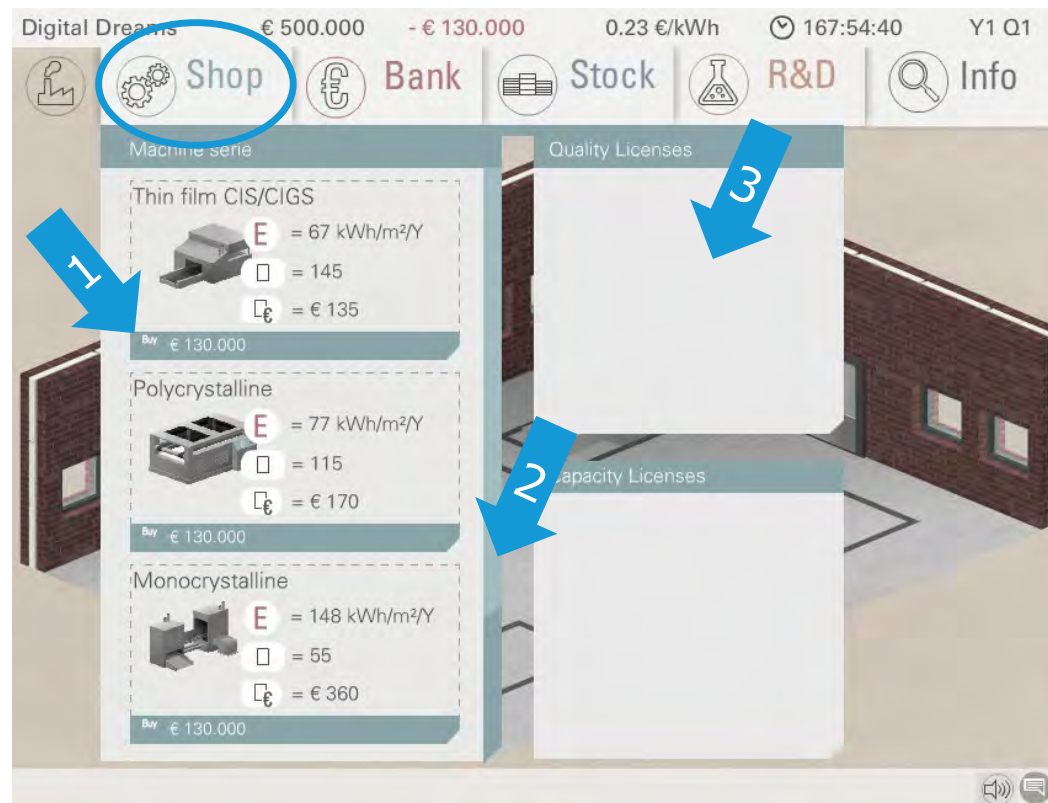
1. Your funds
2. Spendings next quarter
3. Electricity price
4. Time remaining
5. Demolish machines
6. Messaging





Tab 1—Shop

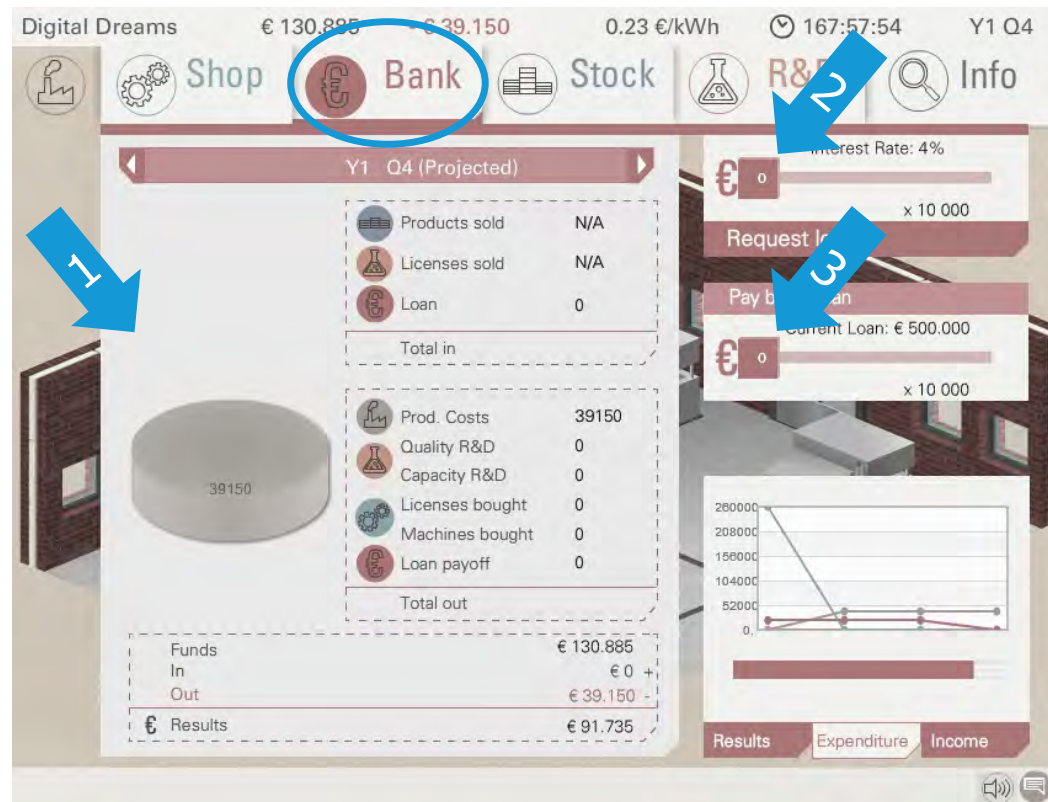
1. Buy machines
2. Scroll down for more machines
3. (disabled) Buy licenses





Tab 2—Bank

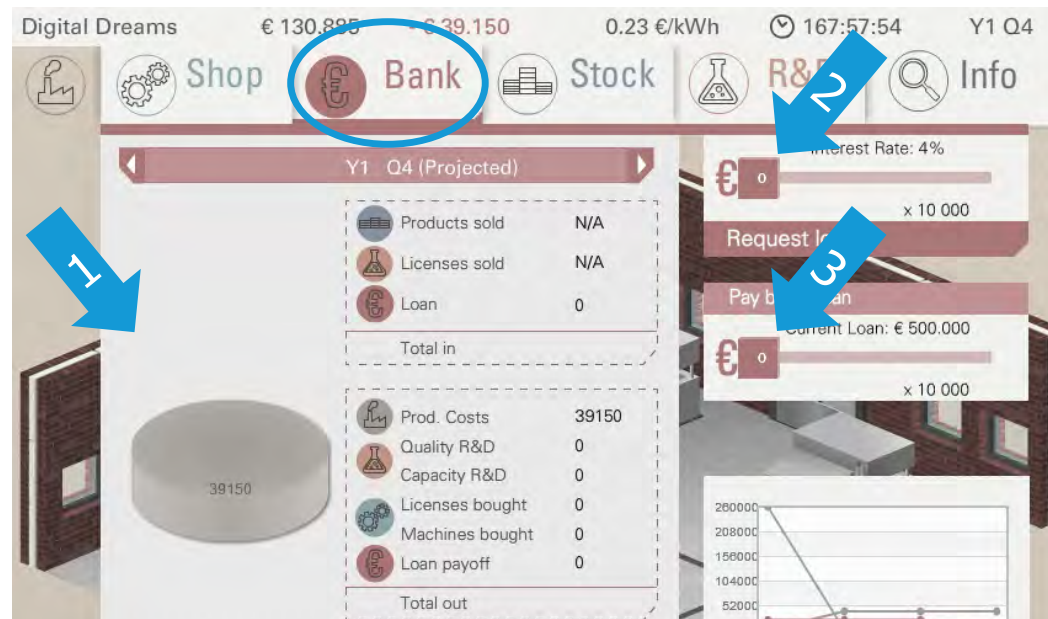
1. Financial overview
2. Request loan (inform us!)
3. Pay back loan (less interest)





Tab 2—Bank

1. Financial overview
2. Request loan (inform us!)
3. Pay back loan (less interest)



Confirm by pressing the "request loan" button



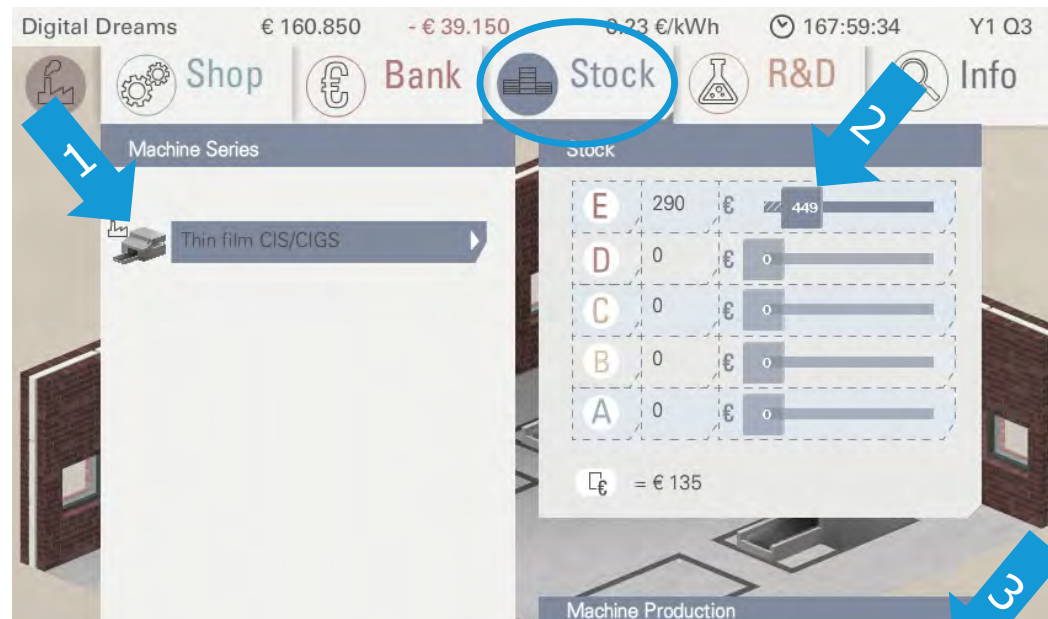
Tab 3—Stock

1. Select machine
2. Set price for each quality in stock
3. Set production levels



Tab 3—Stock

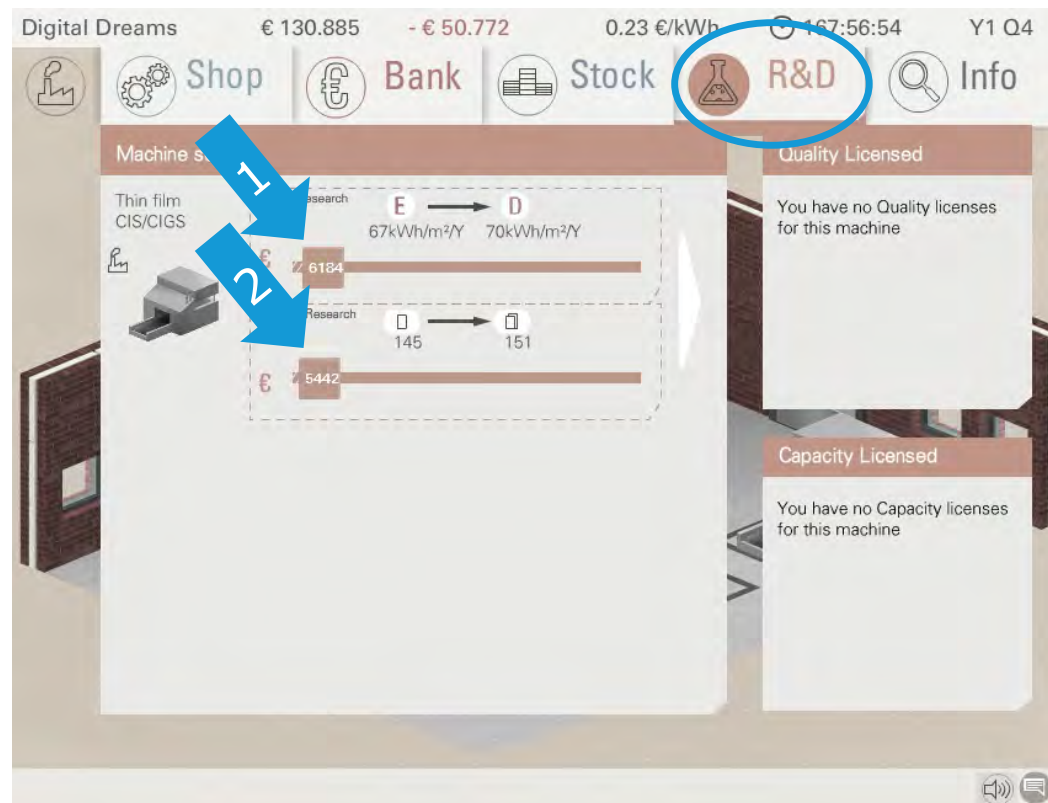
1. Select machine
2. Set price for each quality in stock
3. Set production levels



Unsold panels remain in stock

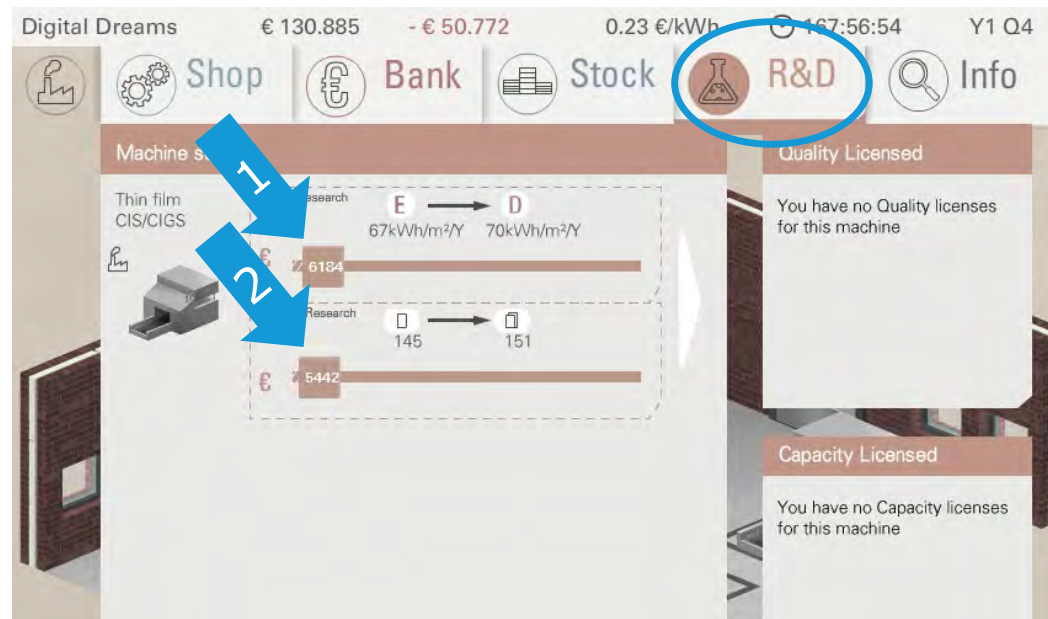
Tab 4—R&D

1. Set amount to invest in improving the quality of this kind of panel
2. Set amount to invest in improving the quantity of panels produced / machine



Tab 4—R&D

1. Set amount to invest in improving the quality of this kind of panel
2. Set amount to invest in improving the quantity of panels produced / machine



R&D is stochastic, but investments accumulate

Tab 5—Info

1. News about environment, R&D, sales, etc.
2. Competitors sub-tab
3. Overview electricity prices



Tab 5—Info

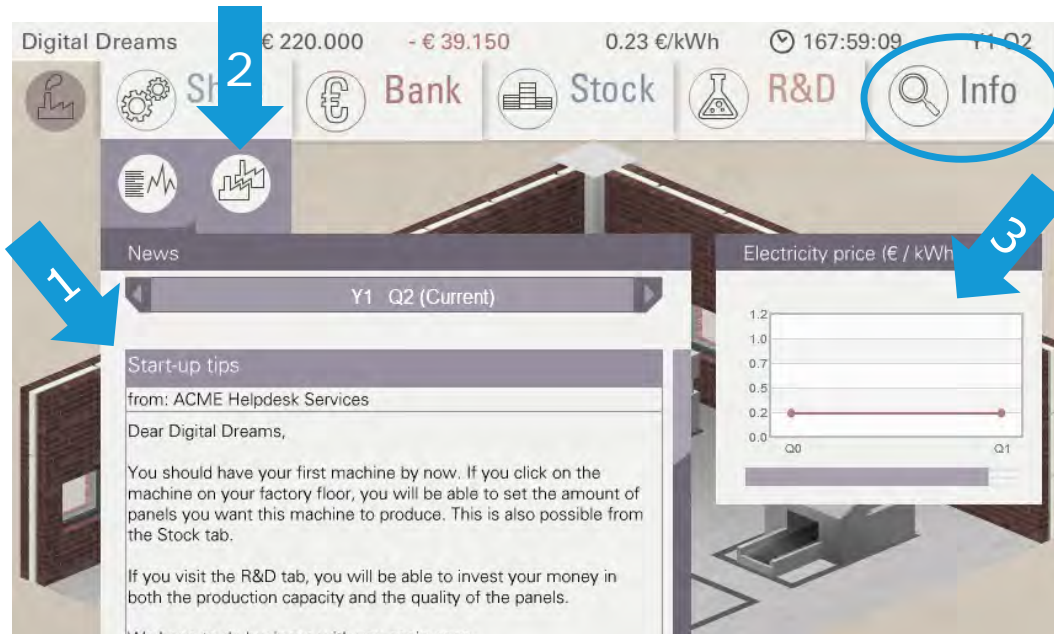
1. News about environment, R&D, sales, etc.
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Tab 5—Info

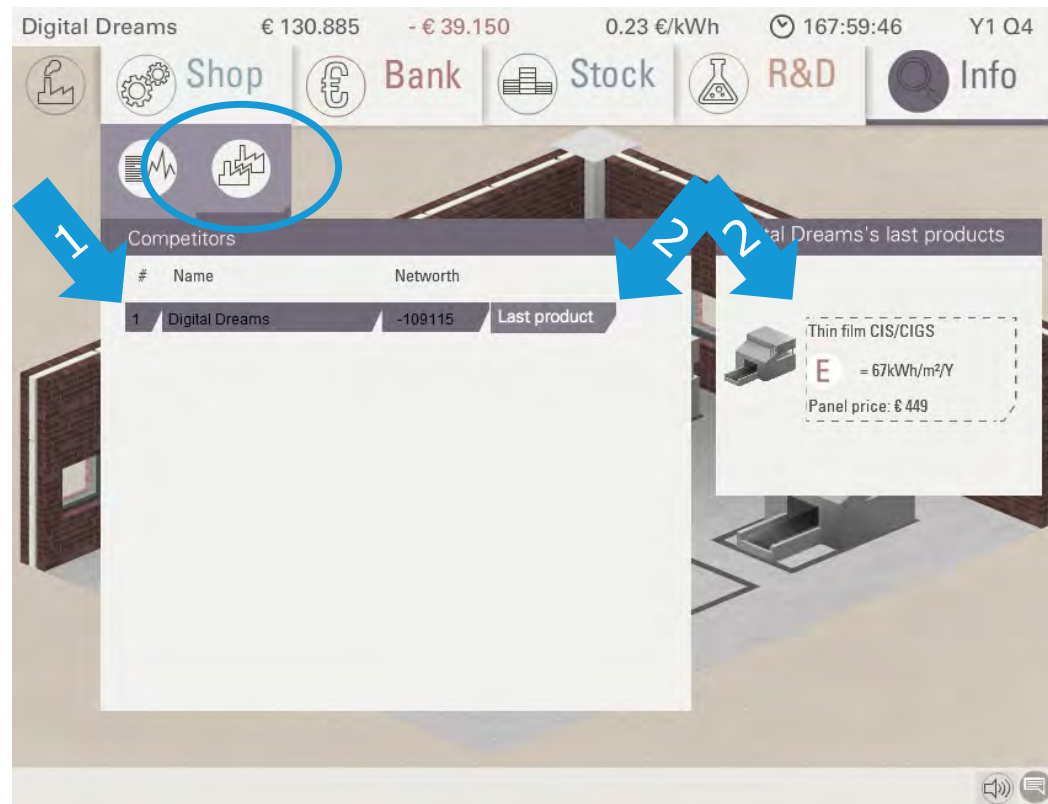
1. News about environment, R&D, sales, etc.
2. Competitors sub-tab
3. Overview electricity prices



News is important, always scroll down to read it

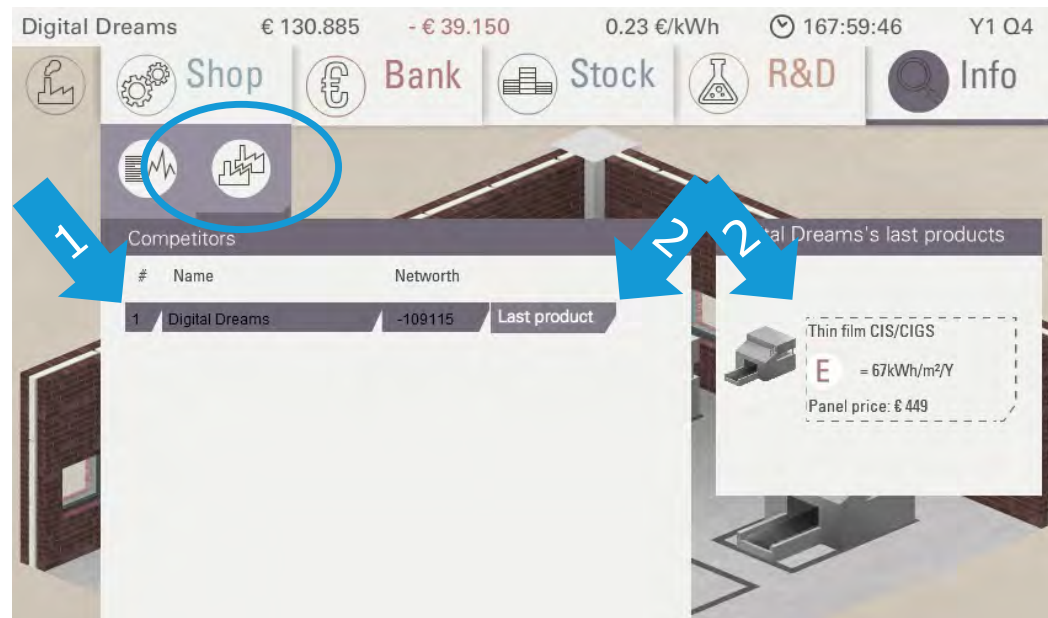
Tab 5—Info (competitors)

1. Ranking of immediate firm value
2. Products offered by the selected firm

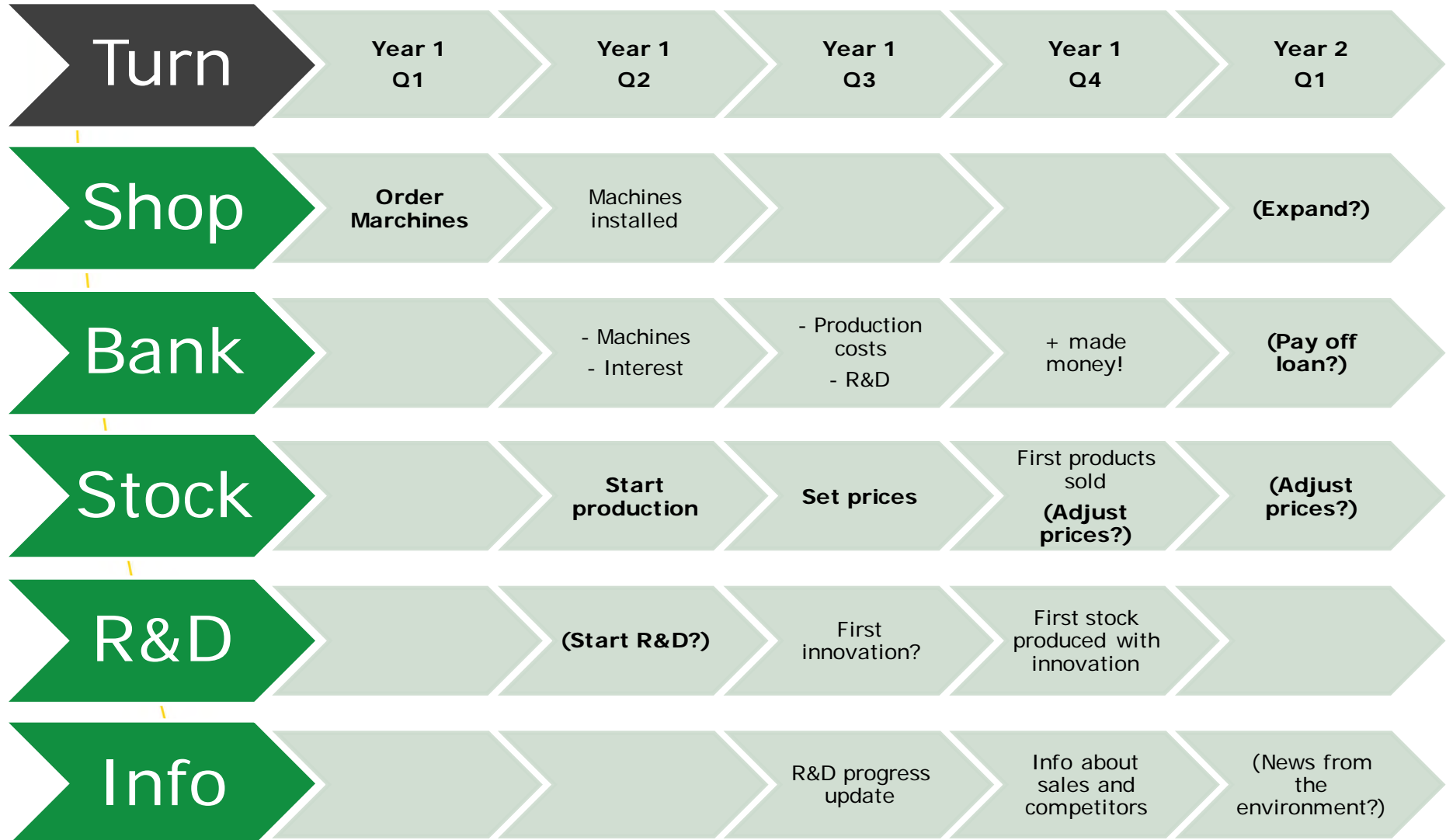


Tab 5—Info (competitors)

1. Ranking of immediate firm value
2. Products offered by the selected firm



Net worth does not include stock!





Note

- Click on a slider with numbers to type.
Confirm with enter
- No refunds on demolished machines
- Make notes (Excel, paper, whatever)
- Issues? Ask us to pause asap



- **Plan ahead**
- **Spend your time wisely**
- **Anticipate how environment impacts market**

